

# Say Goodbye to

# Methylene Chloride

## Navy Depots Find Replacements for Hazardous Paint Stripper

**I**n an effort to reduce the amount of methylene chloride used at the Naval Air Depots (NADEP), the Materials Engineering Division, comprised of chemists, material engineers, and engineering technicians from the Naval Air Systems Command (NAVAIR), led the way to finding and implementing alternative solutions.

Due to its unique ability to penetrate and lift most types of finishes, meth-

ylene chloride has been the paint removal solvent of choice in industry and the Department of Defense (DoD) for many years. Unfortunately, some of the chemicals used most frequently in industry and DoD turn out to be the most harmful to our health and the environment. Methylene chloride, a volatile Hazardous Air Pollutant (HAP), is one such chemical.

Paint is removed from aircraft and components to facilitate corrosion work, inspection for cracks and other damage. In addition, paint has a useful life limit and must be replaced over time. At the NADEPs, paint is removed from an aircraft and components before

reworking or repainting either by chemical stripping or abrasive means. In order to chemically strip paint from an aircraft or component, a solvent-based stripper is applied to the aircraft or component by spraying, wiping, or dipping and the paint is then rinsed or physically scrapped off. Before rinsing or scraping occurs, the solvent must remain in contact with the painted surface for a period of two to eight hours, depending on the ambient temperature and the paint stripping system being used. Paint is also removed from most aircraft and large components using Plastic Media Blasting (PMB). However, there are instances when abrasive blasting cannot be used effectively, such as "flight ready aircraft." Blasting can damage sensitive components. These cases warrant paint removal using chemical stripping.



Getting rid of methylene chloride for aircraft paint stripping dramatically improves the quality of the working environment while eliminating a priority hazardous waste stream.



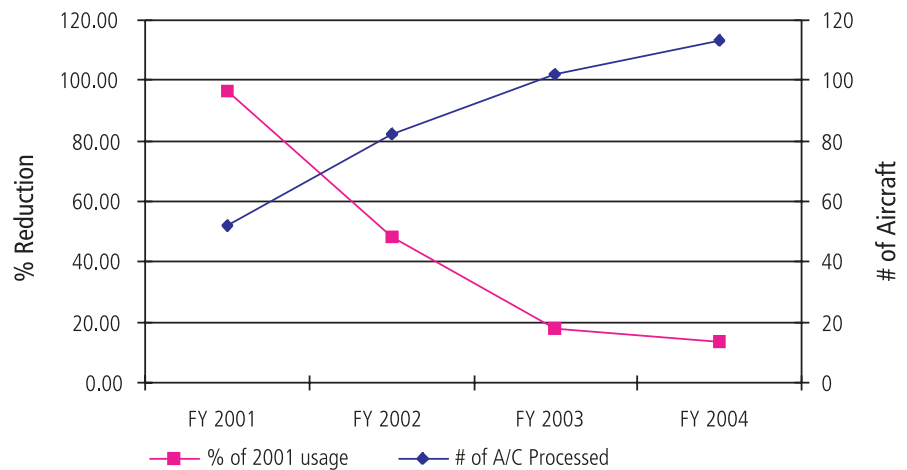
The National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations were enacted by the United States Environmental Protection Agency for the purpose of lowering air pollution from aerospace manufacturing and rework facilities. Among other impacts, this limited the use of chemical paint removers containing HAPs, such as methylene chloride. In 1998, the NESHAPs limited the use of methylene chloride to aircraft spot stripping only and specifically limited use to a maximum of 50 gallons per aircraft. All three NADEPs became subject to this regulation, and compliance was mandatory. Fines were established at up to a total of \$25,000 per day per incident of non-compliance.

In a move to reduce the amount of HAP stripper (and methylene chloride) use at the NADEPs, the Materials Engineering Division, comprised of chemists, material engineers, and engineering technicians, led the way to finding and implementing alternative solutions. The summary information below indicates the great strides that have been made among the depots to comply with the NESHAPs and reduce the amount of methylene chloride used on aircraft.

### Naval Air Depot Cherry Point, NC

- Primary paint removal method for aircraft and components is PMB.
- Additional reductions in methylene chloride based paint removers with the implementation of MIL-R-83936 heated tank paint removers and TT-R-2918 aircraft surface paint removers.
- Methylene chloride based paint removers only utilized for dress out work around previously masked areas and some minor component paint removal when the heated tank process is fully loaded or otherwise unavailable.

### Methylene Chloride Reduction—NADEP Cherry Point



The use of methylene chloride at NADEP Cherry Point has been reduced although the number of aircraft processed has actually increased.

### Naval Air Depot Jacksonville, FL

- With the implementation of the 1998 NESHAP requirement and 50-gallon limit of methylene chloride use on aircraft, the primary method of paint removal for fighter aircraft and aircraft components migrated from methylene chloride stripping to Plastic Media Blast (PMB) stripping in a temporary facility. For P-3 aircraft, a rigorous program was established by NAVAIR to develop and qualify non-HAPs strippers under TT-R-2918.
- In a parallel effort, an exhaustive review of alternative aircraft paint stripping technologies was conducted by NAVAIR. After results were reviewed, NADEP Jacksonville determined to install a new and permanent PMB facility for fighter aircraft and to continue to drive for more effective Non-HAPs strippers for the P-3.
- NADEP Jacksonville continues to pursue more effective non-HAPs paint stripping solutions with the

Naval Air Warfare Center—Aircraft Division Patuxent River, MD.

- Currently, the use of PMB and non-HAPs paint stripping solutions in combination with vacuum-hand-sanding for dress out has resulted in zero use of methylene chloride for all aircraft processed through NADEP Jacksonville.
- Additional methylene chloride reductions were made with implementation of Non-HAPs strippers (qualified under TT-R-2918) as replacement for methylene chloride based R-256 to remove paint from engine cans, hydraulic actuators and aircraft seat parts.
- In July 2003, NADEP Jacksonville ceased use of methylene chloride based paint removal systems in support of aircraft and component paint stripping.
- While total aircraft workload remained relatively constant since 1999, the following table shows that the use of methylene chloride has been dramatically reduced. In addition, during this same period, reductions in non-HAPs strippers have been realized as the performance of non-HAPs strippers has been improved.

## HAP Stripper Usage at NADEP Jacksonville

Fiscal Year	HAP Stripper (in gallons)	Non-HAP Stripper (in gallons)
1999	6,616	26,675
2000	5,034	23,265
2001	1,320	19,525
2002	722	11,165
2003	990	8,850
2004	Near Zero Estimate	



Non-HAP paint stripping  
of a P-3 Orion aircraft  
at the Naval Air Depot  
Jacksonville, FL.

## Naval Air Depot North Island, San Diego, CA

- Since early 1990, PMB has been the primary paint removal method for aircraft and components.
- Methylene chloride based paint removers were only utilized for selected areas of spot strip and dress out work around previous masked areas in full compliance with the NESHAP.
- The only major use of methylene chloride is in dip tank stripping operations for aircraft components. Alternative depainting methods have been considered, but a more effective method has not yet been identified.
- Implementation of PMB strip for aircraft in early 1990's secured early compliance with the 1998 NESHAP requirement.

## Methylene Chloride Use at NADEP North Island

Year	Total Methylene Chloride Use	Use of Methylene Chloride on Aircraft
2000	22,670 lbs (2,059 gallons)	(Data not available.)
2001	29,745 lbs (2,702 gallons)	464 gallons
2002	20,482 lbs (1,860 gallons)	176 gallons
2003	20,500 lbs (1,862 gallons)	330 gallons

As the above information shows, over the past several years all three NADEPs have worked hard to curtail the use of methylene chloride and to achieve a high level of compli-

ance with the Aerospace NESHAP. And as is frequently the case, when facilities and conditions allow, and once new processes have been prototyped, fine-tuned, and written into applicable maintenance manuals, these benefits are pushed out to the Fleet's Organizational- and Intermediate-level maintenance activities. Although data for methylene chloride reductions at these Operational and Intermediate maintenance activities are not reflected in the data for this article, some significant process changes have been and are being made which are also contributing to the total reduction of methylene chloride use across NAVAIR. ⚓

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